

Appl. No. 10/535,477
Amtd. Dated August 31, 2009
Reply to Office Action of June 26, 2009

Attorney Docket No. 81864.0061
Customer No.: 26021

Remarks/Arguments

Claims 1, 2, 6, 7, and 11 are amended. Claims 12-13 are canceled. Claims 1-11 and 14-20 are pending in the application. Claims 15-20 are withdrawn. Reexamination and reconsideration of the application, as amended, are respectfully requested.

Claim Rejections Under 35 USC § 112 Second Paragraph

Claims 1-14 stand rejected 35 U.S.C. § 112, second paragraph as being indefinite. More specifically, the Examiner indicates that claims 1-2, 6-7, and 11 are indefinite because it is unclear whether the parenthetical phrase is a limitation or an exemplary embodiment.

Applicant has amended the claims to eliminate the parenthesis, thus rendering the claims clear. Applicant respectfully submits that the rejections have been overcome and should be withdrawn.

Claim Rejections Under 35 USC § 102

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Takaya, et al. (E.P. 1262450/ U.S. Pub. No. 2002/0197461).

Claims 2-4 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Takaya, et al. (E.P. 1262450/ U.S. Pub. No. 2002/0197461) (referred to as Takaya '461). Applicant respectfully traverses these rejections.

Claim 1 as amended is as follows:

A composite dielectric material comprising a resin material and an approximately spherical dielectric ceramic powder to be mixed with said resin material, the composite dielectric material being characterized in that:

said dielectric ceramic powder is based on BaO-
 R₂O₃-TiO₂,

 said dielectric ceramic powder comprises an oxide
 of a transition metal element having at least two states of
 ionic valences less than 4;

 said dielectric ceramic powder has a specific surface
 area of 1.2 m²/g or less and exclusive of 0;

 the content of said dielectric ceramic powder is 40
 vol% or more and 70 vol% or less when the total content of
 said resin material and said dielectric ceramic powder is
 represented as 100 vol%; and

 the electric resistivity of said composite dielectric
 material is $1.0 \times 10^{12} \Omega\cdot\text{cm}$ or more,

 wherein R is a rare earth element and R₂O₃ is an
 oxide of the rare earth element.

Claim 2 as amended is as follows:

 A composite dielectric material comprising a resin
 material and a dielectric ceramic powder to be mixed with
 said resin material, the composite dielectric material
 being characterized in that:

 said dielectric ceramic powder is based on BaO-
 R₂O₃-TiO₂ and the sphericity thereof is 0.8 to 1;

 said dielectric ceramic powder comprises an oxide
 of a transition metal element having at least two states of
 ionic valences less than 4;

said dielectric ceramic powder has a specific surface area of 1.2 m²/g or less and exclusive of 0;

 the content of said dielectric ceramic powder is 40 vol% or more and 70 vol% or less when the total content of said resin material and said dielectric ceramic powder is represented as 100 vol%; and

 the electric resistivity of said composite dielectric material is $1.0 \times 10^{12} \Omega\text{-cm}$ or more,

 wherein R is a rare earth element and R₂O₃ is an oxide of the rare earth element.

Applicant respectfully submits that Takaya '461 fails to disclose or suggest any relationship between at least the following features as set forth in claims 1 and 2: 1) specific surface area of a dielectric ceramic powder; 2) an oxide of a transitional metal element having at least two states of ionic valences less than 4; and 3) electric resistivity of a composite dielectric material. In contrast, Takaya '461 discloses single crystal ceramic powder comprising oxide dielectric materials or oxide magnetic materials (paragraphs 21 & 47-49), with sphericity of 0.9 to 1.0 (paragraph 64). Takaya '461 further discloses that single crystal ceramic powder with sphericity of 0.9 or greater improves its filler characteristics and is advantageous when used as fillers for resins and as such teaches away from any relationship between specific surface area of a dielectric ceramic powder, an oxide of a transitional metal element, and electric resistivity (paragraphs 13, 20, and 22-23).

MPEP 2144.05 makes it clear that a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable

might be characterized as routine experimentation [*In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)]. The specification of the present invention discloses that "If the specific surface area of the dielectric ceramic powder is made to be as small as 1.2 m²/g or less (exclusive of 0) when producing the composite dielectric material, the electric resistivity is decreased. The present inventor investigated to overcome this adverse effect, and consequently found that by making the dielectric ceramic powder contain at least one oxide selected from a Mn oxide, a Cr oxide, a Fe oxide, a Co oxide, a Ni oxide and a Cu oxide, the decrease of the electric resistivity can be suppressed even when the specific surface area of the dielectric ceramic powder is small" (paragraph 19 of U.S. Pub. No. 2006/0211800A1). In other words, a composite dielectric material having an oxide of a transitional metal element with at least two states of ionic valences less than 4, prevents decreases in the electric resistivity of the dielectric material as the surface area of the ceramic powder in the dielectric material decreases. As such, the present invention clarifies the relationship between surface area, an oxide of a metal element, and electric resistivity.

In view of the foregoing, Takaya '461 does not teach or suggest the composite dielectric material as set forth by claims 1-2. Likewise, dependent claims 3-4 are also patentable over Takaya '461 for at least the same reasons as claims 1-2. In view of the foregoing, Applicant respectfully requests that the Office withdraw the rejection.

Claim Rejections Under 35 USC § 103

Claims 1, 3, 12, and 14 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Takaya, et al (U.S. Pub. No. 2002/0132898) (referred to as Takaya '898) in view of Takaya '461.

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Claim 12 has been canceled without prejudice, thus the rejection against this claim is now moot.

Claims 1, 3, and 14 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Takaya '898 in view of Takaya '461. Applicant respectfully traverses this rejection.

Applicant respectfully submits that Takaya '898 fails to disclose or suggest at least the following as set forth by claim 1: a composite dielectric material comprising a resin material and a dielectric ceramic powder where 1) the electric resistivity of the composite dielectric material is $1.0 \times 10^{12} \Omega\text{-cm}$ or more; 2) the ceramic powder comprises an oxide of a transition metal element having at least two states of ionic valences less than 4; and 3) a dielectric ceramic powder that is approximately spherical. In contrast, Takaya '898 discloses: 1) a 10^{14} ohm-cm volume resistivity of a substance comprising a mixture of a resin and flame retardant (Table 10 & paragraphs 445-448); 2) ferrite or ferromagnetic metal powders that may be used in composite magnetic substrates (4th embodiment) (paragraphs 275 & 203); and 3) magnetic particles that may be spherical in shape (paragraph 279).

Takaya '461 is not seen to remedy the defects of Takaya '898 and is cited for its relevance regarding spherical ceramics (paragraph 20). The claims are also patentable over Takaya '461 as indicated above. In view of the foregoing, the combined teachings of the prior art fail to teach or suggest each element of the claimed invention. Thus, the combination suggested by the Office cannot render the claimed invention obvious.

Claims 6-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Takaya '461 in view of Miyashita, et al. (U.S. Pat. No. 4,803,591. Applicant respectfully traverses this rejection.

Claim 6 as amended is as follows:

The composite dielectric material according to
claim 1 or 2, characterized in that:
said dielectric ceramic powder comprises one or
more of a Mn oxide, a Cr oxide, a Fe oxide, a Co oxide, a
Ni oxide and a Cu oxide, as said oxide of the transition
metal element having at least two states of ionic valences
less than 4.

Claim 6 depends from claims 1 or 2, and as such includes all the limitations thereof, and is therefore patentable over Takaya '461 for at least the same reasons discussed above with regard to claims 1 and 2.

Miyashita is not seen to remedy the defects of Takaya '461 and is cited for its relevance regarding the specific surface area of the ceramic powder. As such, the combined teachings of the prior art fail to teach or suggest any relationship between surface area, an oxide of a metal element, and electric resistivity. Thus, the combination suggested by the Office cannot render the claimed invention obvious.

Accordingly, Takaya '461 in view of Miyashita is not obvious over the present claim 6. Likewise, dependent claims 7-11 are patentable for at least the same reasons as claim 6. In view of the foregoing, Applicant respectfully requests that the Office withdraw the rejection.

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Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Takaya '461 as applied to claim 2 above, in view of Tateishi, et al. (U.S. Pat. No. 5,650,868). Applicant respectfully traverses this rejection.

Claim 5 depends from claims 1 or 2, and as such includes all the limitations thereof, and is therefore patentable over Takaya '461 for at least the same reasons discussed above with regard to claims 1 and 2.

Tateishi is not seen to remedy the defects of Takaya '461 and is cited for its relevance regarding the dielectric ceramic composition. More specifically, Tateishi discloses a composition wherein Ba is 16.75-23.75 mol%, rare earth elements such as Nd are 16.75-23.75 mol%, and a group IV element such as titanium is 67-71.66 mol% (abstract). As such, the combined teachings of the prior art fail to teach or suggest any relationship between the surface area, an oxide of a metal element, and the electric resistivity the claimed invention. In fact, Tateishi teaches away from this relationship because Tateishi's ceramics provide for use in small capacitors having large capacitances and improved reliability, which exhibit dielectric constants ϵ of as large as 50 or more, a Q-value of as large as 3000 or more, and a temperature coefficient of capacitance TCC as small as not larger than ± 30 ppm/ $^{\circ}$ C (col. 1, ll. 56-64). Thus, the combination suggested by the Office cannot render the claimed invention obvious.

Accordingly, Takaya '461 in view of Tateishi is not obvious over the present claim 5. In view of the foregoing, Applicant respectfully requests that the Office withdraw the rejection.

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In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

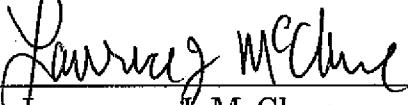
If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310)785-4600 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

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By: 
Lawrence J. McClure
Registration No. 44,228
Attorney for Applicant(s)

1999 Avenue of the Stars, Suite 1400
Los Angeles, California 90067
Telephone: (310) 785-4600
Facsimile: (310) 785-4601